

JPRS-USB-86-002

25 FEBRUARY 1986

# USSR Report

## SPACE BIOLOGY AND AEROSPACE MEDICINE

### TABLES OF CONTENTS

JPRS-USB-85-001, 14 FEBRUARY 1985-

JPRS-USB-85-007, 25 NOVEMBER 1985



FOREIGN BROADCAST INFORMATION SERVICE

## NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

## PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

Soviet books and journal articles displaying a copyright notice are reproduced and sold by NTIS with permission of the copyright agency of the Soviet Union. Permission for further reproduction must be obtained from copyright owner.

JPRS-USB-85-001

14 February 1985

# USSR Report

SPACE BIOLOGY AND AEROSPACE MEDICINE

## TABLE OF CONTENTS

JPRS-USB-84-001, 17 January 1984-

JPRS-USB-84-006, 2 October 1984

**FBIS**

FOREIGN BROADCAST INFORMATION SERVICE



21 February 1985

# USSR REPORT

## SPACE BIOLOGY AND AEROSPACE MEDICINE

Vol. 18, No. 6, November-December 1984

Translation of the Russian-language bimonthly journal  
KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA  
published in Moscow by Izdatel'stvo "Meditsina"

### CONTENTS

External Respiration, Gas Exchange and Energy Expenditures of Man in Weightlessness .....	1
Blood Amino Acids of Cosmonauts Before and After 211-Day Spaceflight .	10
Circadian Rhythm of Human Body Temperature During Spaceflights .....	18
Biochemical Status of Adrenocortical Dysfunction Following Spaceflight	23
Comparative Analysis of Effects of Weightlessness and Its Models on Velocity and Strength Properties and Tone of Human Skeletal Muscles	28
Cosmonauts' Blood Plasma Free Amino Acid Levels During Preflight Training .....	34
LBNP Training of Crew Members on Main Missions Aboard Salyut-6 Orbital Station .....	38
Main Component Method Used to Study Variations of Cardiovascular Parameters .....	45
Role of Mental Work in Human Tolerance to Total-Body Vibration .....	51
Human Lung Fluid Content During 7-Day Head-Down Tilt .....	55
Morphological Study of Myocardium of Monkeys Submitted to Antiorthostatic Hypokinesia .....	61
Fluid Metabolism of Monkeys During 2-Week Antiorthostatic Hypokinesia	68

Distinctive Morphological Manifestations of Acute Stress Reaction in Adrenal Cortex of Hypokinetic Rats .....	76
Preventive Effect of Acute Heat Factors During Hypokinesia .....	83
Investigation of Adaptive Distinctions of Mechanism of Controlling Glycemia in Macaca Rhesus Monkeys .....	89
Multiple Regression Method Used to Assess Animal Adaptation to Hypoxic Hypoxia .....	96
Effect of High Ammonia Content in Closed Environment on Some Parameters of Human Nitrogen and Carbohydrate Metabolism Against Background of a Controlled Diet .....	100
Model of Information-Reference Dialogue System for Working With Document Abstracts .....	106
Spirolit-2 Instrument Used to Test Pulmonary Ventilation .....	113
Parameters of Carbohydrate Metabolism and Blood Serum Enzyme Activity After Short-Term Spaceflights .....	116
Results of Sanitary-Microbiological Studies Aboard Cosmos-936 and Cosmos-1129 Biosatellites .....	119
Dynamics of Quantitative and Qualitative Changes in Conditionally Pathogenic Microflora of the Human Intestine During Long-Term Hypokinesia .....	123
Rat Tissue Opioid Peptide Content During Long-Term Hypokinesia .....	127
Effect of Long-Term Repeated Exposure to High-Intensity Stationary Magnetic Field on Adrenomedullary Activity .....	132
Effect of Stationary Magnetic Field on Bleeding Time .....	136
Review of U. S. Manual of Clinical Aviation Medicine .....	140
Review of U. S. Guide on Medication and Flying .....	146
Aleksandr Aleksandrovich Sergeyev (on His 90th Birthday) .....	149
Synopses of Articles Filed With the All-Union Scientific Research Institute of Medical and Medicochemical Information and All-Union Institute of Scientific and Technical Information .....	151

PUBLICATION DATA

English title	: SPACE BIOLOGY AND AEROSPACE MEDICINE Vol 13, No 6, Nov-Dec 84
Russian title	: KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA
Editor	: O. G. Gazenko
Publishing house	: Meditsina
Place of publication	: Moscow
Date of publication	: November-December 1984
Signed to press	: 18 October 1984
Copies	: 1440
COPYRIGHT	: "Kosmicheskaya biologiya i aviakosmicheskaya meditsina", 1984





18 April 1985

## USSR REPORT

## SPACE BIOLOGY AND AEROSPACE MEDICINE

Vol. 19, No. 1, January-February 1985

Translation of the Russian-language bimonthly journal  
KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA  
published in Moscow by Izdatel'stvo "Meditsina"

## CONTENTS

Factor Analysis of Reaction to Lower Body Negative Pressure Test on the Ground and During Spaceflight .....	1
Effect of Spaceflight Factors on Hormonal Regulation of Fluid-Electrolyte Metabolism .....	4
Effect of Space Diet on Blood Valine Content .....	9
Operator's Mental Adaptation and Work Capacity in Simulated Weightlessness .....	22
Effect of Rotation and Vibration on Human Orientation Relative to Gravity Vertical .....	30
Rheological Parameters of Blood at Different Levels of Motor Activity	37
Comparative Characteristics of Central Hemodynamics and Circulatory Redistribution Reactions to Active and Passive Orthostatic Tests ..	42
Amino Acid Composition of Human Blood Serum During Immersion Hypokinesia .....	53
Effect of Long-Term Hypokinesia on Blood Serum Lipid Spectrum .....	57
Distinctive Changes in Regional Hemodynamics and Gas Exchange in Healthy Man in Response to Moderate Phlebotomy and Reinfusion of Blood After Submitting to Antiorthostatic Hypokinesia .....	63

Activation of Lipid Peroxidation in the Liver Under Hypokinetic Conditions and Its Prevention With Antioxidants .....	68
Specificity of Ultrastructural Changes in Rat Myocardium Submitted to Hypokinesia and Radiation Damage .....	75
Lenticular Opacities in Mice Exposed to Helium Ions With Energy of 4 GeV/Nucleon and $^{60}\text{Co}$ Gamma Radiation .....	80
Skin Lesions After Exposure to High-Energy Protons and Helium Ions ...	84
Effect of Flight Aboard Cosmos-1129 Biosatellite on Thyroid Hormone Levels in Rat Blood and Thyroid Tissue .....	89
Prospects of Using Unicellular Algae Protein in Biological Life-Support Systems .....	94
Investigation of Toxic Properties of Preservatives to be Used in Water Recycling Systems .....	100
Relevance of Water Structure to Assessment of Quality of Recycled of Quality of Recycled Water .....	105
Mathematical Model of Cyclic Kinetics of Granulocytopoiesis .....	111
Methods for Measuring External Respiration and Gas Exchange Parameters of Macaca Rhesus Monkeys .....	117
Investigation of Growth Rate of Methane-Assimilating Bacteria in Weightlessness .....	121
Prediction of Classes M and X X-Ray Phenomena .....	125
New Book of Selected Lectures on Aviation Medicine .....	129
Synopses of Articles Filed With the All-Union Scientific Research Institute of Medical and Medico-technical Information and All-Union Institute of Scientific and Technical Information .....	131
Index of Articles: KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA, Volume 18, Numbers 1-6, 1984 .....	137
Author Index: KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA, Volume 18, Numbers 1-6, 1984 .....	147

12 August 1985

USSR REPORT  
SPACE BIOLOGY AND AEROSPACE MEDICINE  
Vol 19, No 2, March-April 1985

Translation of the Russian-language bimonthly journal  
KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA  
published in Moscow by Izdatel'stvo "Meditsina"

### CONTENTS

Labyrinthine and Extralabyrinthine Mechanisms of Development of Motion Sickness in Weightlessness .....	1
Psychophysiological Distinctions of Organization and Regulation of Daily Cyclograms of Crew Activities During Long-Term Spaceflight ...	12
Operator's Functional Comfort Zone When Controlling Moving Object ...	19
Rapid Determination of Cadet Discipline by Projective Tests .....	24
Effect of Body Position and Immobilization on Intensity of Spatial Illusions in Weightlessness .....	30
Typological Characteristics of Hemodynamic States of Healthy Subjects in Orthostatic Position .....	34
Investigation of Spectrum of Human Bile Acids During 120-Day Antiorthostatic Hypokinesia .....	44
Vascular Mechanisms of Adaptation to Antiorthostatic Position .....	47
Cerebral Hemodynamics and Ventricular Function in -15° Antiorthostatic Position.	54
Effect of Short-Term Antiorthostatic Hypokinesia on Dynamics of Cardiorespiratory Parameters During Graded Physical Exercise .....	59
Investigation of Some Aspects of Amino Acid Metabolism in Man During Brief Exposure to Antiorthostatic Hypokinesia Combined With Ultraviolet Radiation .....	64

General Description of Experiment Dealing With Rat Ontogenesis Aboard Cosmos-1514 Biosatellite .....	68
Morphological Study of Antiorthostatic Hypokinesia in Monkeys .....	75
Rat Plasma Hormone Levels Following Flight Aboard Cosmos-1129 Biosatellite .....	85
Results of Microbiological Studies Conducted During Operation of Salyut-6 Orbital Station .	91
Distinctions in Formation of Microflora on Construction Materials Used in Habitable Pressurized Compartments .....	95
Composition and Dynamics of Bacteriocenosis Associated With Algae in Human Life-Support Systems .....	99
Experimental Validation of Allowable Concentrations of Sodium and Potassium in Recycled Drinking Water .....	107
Mammalian Tissue Sensitivity to Long-Term Exposure to High-Intensity Stationary Magnetic Fields .....	113
Electroanesthesia as a Means of Controlling Cold Stress of Local Hypothermia .....	118
Morphological Manifestations of Hemodynamic Changes in Lungs of Monkeys Submitted to Antiorthostatic Hypokinesia .....	123
Regulation of Physical Activity in Antiorthostatic Position by Acting on Adrenosympathetic and Hypophyseo-Adrenocortical Systems.	127
Effect of Experimental Motion Sickness on Postrotatory Nystagmus and Counterrotation Illusion.	131
Chemical Composition of Musca Domestica L. Larval and Pupal Biomass When Developing in Organic Waste of Biological Life-Support System for Man .....	135
Effect of Substrate Moisture on Growth and Structure of Corn Leaf ..	140

14 August 1985

# USSR REPORT

## SPACE BIOLOGY AND AEROSPACE MEDICINE

Vol 19, No 3, May-June 1985

Translation of the Russian-language bimonthly journal  
KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA  
published in Moscow by Izdatel'stvo "Meditsina"

### CONTENTS

Fortieth Anniversary of the Soviet People's Victory in the Great Patriotic War, and Aviation Medicine .....	1
Electromagnetic Radiofrequency (Microwave) Radiation: Guidelines, Criteria for Setting Standards and 'Threshold' Dose Levels .....	7
Fluid-Electrolyte Metabolism and Renal Function in Cosmonauts Following 185-Day Spaceflight .....	27
Tolerance to +Gz and +Gx Accelerations of Individuals in Older Age Groups in Good Health and With Early Signs of Atherosclerosis ...	35
Effect of Hypokinesia and +Gz Accelerations on Transport Function of Human Blood .....	42
Oxygenation and Regional Circulation in Gingival Mucosa During Exposure to Lower Body Negative Pressure .....	46
Effect of Water Immersion on Parameters of Central Hemodynamics in Individuals Over 45 Years Old .....	51
Lipid Hydrolysis in Man During Antiorthostatic Hypokinesia .....	57
Dissociation of Autonomic and Sensory Vestibular Reactions .....	63
Investigation of Vestibular Structure and Ion Composition of Spur-Toed Frog Larvae After Exposure to Weightlessness .....	70
Pairing Principle and Kinematic Asymmetry of Otolith System .....	76

Rat Skeletal Muscles With Simulation of Physiological Effects of Weightlessness (Morphological Study) .....	81
Effect of Brief Heat on Tissular Respiration of Skeletal Muscles and Viscera of Hypokinetic Chickens .....	87
Effect of Acute Hypoxia on Coronary and Systemic Hemodynamics .....	93
Effect of Dibazol on Parameters of Nonspecific Resistance of Subjects in Pressurized Cabins .....	99
Effect on Seeds of Heavy Charged Particles of Galactic Cosmic Radiation .....	103
Monitoring Dosage of Volatile Compounds in Tests at Low Barometric Pressure .....	108
Determination of Individual Tolerance to Hyperbaric Oxygen .....	111
Development of Interactive Data Processing System in Psychological Engineering Studies .....	114
Results of Echocardiographic Studies of Resting Macaca Mulatta Monkeys .....	121
Lipogenesis in Rat Liver After Flight Aboard Cosmos-1129 Biosatellite .....	126
Methods for Pilots and Cadets to Resolve Frustrating Situations .....	129
New Book on Diagnostic Nystagmometry by M. M. Levashov .....	133
Problems of Aviation and Space Medicine and Psychology Discussed at Fourteenth Gagarin Lectures .....	136
Petr Kuz'mich Isakov (1909-1984) .....	145
Synopses of Articles Filed With the All-Union Scientific Research Institute of Medical and Medico-technical Information and All-Union Institute of Scientific and Technical Information .....	148



4 November 1985

USSR REPORT  
SPACE BIOLOGY AND AEROSPACE MEDICINE  
Vol. 19, No. 4, July-August 1985

Translation of the Russian-language bimonthly journal  
KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA  
published in Moscow by Izdatel'stvo "Meditsina"

### CONTENTS

Problems of Studying Flying Work in Soviet Aviation Medicine of the 1920's-1930's .....	1
Some Aspects of Determining Human Physical Work Capacity Under Hyperbaric Conditions .	11
Investigation of Factors Determining Pilot's Geocentric Orientation .....	24
Effect of Threat Stress on Psychomotor Stability of Pilots Differing in Anxiety Level ..	31
Use of Flight Simulators for Demonstration of Functional Capacities of Flight Personnel .....	35
Effect of Level of Physical Activity on Lipid Metabolism of Flight Personnel .....	40
Oxygenation and Regional Circulation in Gingival Mucosal Tissues Under Effect of Head-to-Pelvis (+Gz) Accelerations .....	44
Investigation of Some Aspects of Human Amino Acid Metabolism During 120-Day Antiorthostatic Hypokinesia .....	50
Effect of 7-Day Immersion Hypokinesia on Characteristics of Precision Movements .....	54
Effect of "Dry" Immersion Model on Parameters of Fluid- Electrolyte Metabolism, Blood Plasma Aldosterone and Cortisol Levels in Individuals Differing in Body Fluid Content	60

Intensity of Lipid Peroxidation in Hypokinetic Rat Tissues .....	65
Effect of 24,25-Dihydroxyvitamin D <sub>3</sub> on Osteogenetic Precursor Cells in Immobilized Rats .....	70
Basic Results of Experiments With Long-Term Rotation of Rats as Applied to the Problem of Artificial Gravity .....	77
Man's tolerance to Fulminant Form of Hypoxic Hypoxia .....	82
Investigation of Catecholamine Metabolism at High Altitudes .....	87
Determination of Increment of <i>Bacillus Subtilis</i> Biomass in Weightlessness .....	92
Investigation of Microflora of Chufa, a Potential Higher Plant Component of Biological Life-Support Systems for Man .....	96
Investigation of Distinctions Referable to Growth, Development and Metabolism of <i>Closteriopsis Acicularis</i> Algae When Cells Are Limited in Nitrogen as Related to Biological Life-Support Systems for Man ..	101
Formation of Volatile Substances During Polymer Destruction by <i>Pseudomonas Aeruginosa</i> .....	109
One Aspect of Crew Training .....	114
Method of Calculating Angular Dimensions of Flight Vehicle Cockpit Canopy Casings .....	120
Informativeness of Echo Signal in Pulsed Ultrasonography of the Brain (With Use of Model) .....	125
Investigation of Possibility of Using Two-Frequency Impedometry for Estimation of Proportion of Total and Extracellular Body Fluid .	131
Automatic Determination of Cardiac Output From Rheogram of the Trunk	137
Functional State of the Olfactory Analyzer in a Pressurized Environment .....	141
Gas Chromatographic Analysis of Free Fatty Acids of Skin Surface Lipids .....	145
Investigation of Mineral Nutrition of a New Form of Microalgae to Be Used in Biological Life-Support Systems .....	149



25 November 1985

# USSR REPORT

## SPACE BIOLOGY AND AEROSPACE MEDICINE

Vol. 19, No. 5, September-October 1985

Translation of the Russian-language bimonthly journal  
KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA  
published in Moscow by Izdatel'stvo "Meditsina"

### CONTENTS

Hygienic Aspects of Regular Diet of Flight Personnel .....	1
Metabolic Distinctions of Human Red Blood During Long-term Spaceflights .	22
Human Body Biomechanics and Movements After 120-Day Antiorthostatic Hypokinesia ...	27
Functional Activity of Human Serotonergic and Histaminergic Systems During Long-Term Antiorthostatic Hypokinesia .....	33
Body Position During Hypokinesia, and Fluid-Electrolyte Metabolism ..	38
Microcirculation and Cellular Hemostasis in Men With Borderline Arterial Hypertension Submitted to Neutral-Temperature 'Dry' Immersion in Water .....	44
Effect of Positive Pressure Breathing on Hemodynamics in Patients With Borderline Hypertension Submitted to Water Immersion .....	50
Roentgenological and Pathomorphological Changes in the Heart of Dogs Submitted to Hypokinesia for Six Months .....	54
Changes in Physical Condition, Vestibular Function and Bone System of Rats Submitted to Long-Term Rotation .....	60
Contractile Properties of Rat Muscle Fibers During Long-Term Exposure to +2 Gx Accelerations	70
Hemodynamic Parameters as Related to Different Tolerance to Head-Pelvis Accelerations .....	75

Changes in Physicochemical Properties of Contractile and Regulatory Proteins in Different Types of Muscles During and After Exposure to Accelerations .....	81
Cumulative Effect of Coriolis Accelerations on Coronary Hemodynamics .	87
Nystagmus as Related to Utricular Function .....	93
Individual Differences in Maximum Oxygen Uptake Regulation and Level .	99
Significance of Vestibular Recruitment and Directional Dominance of Nystagmus in Diagnostic Examinations .....	106
Miniature Piezoelectric Transducer With Elastic Shield for Dynamic Studies of Biological Objects .....,.....	112
Validation of Reliability of Fire Extinguishers for Medical Pressure Chambers .....	116
Age-Related Changes in Electroencephalograms of Pilots .....	120
Drugs and Surfactants Used to Prevent Caisson Disease in Rats .....	123
Effect of 24,25-Dihydroxycholecalciferol on Amino Acid Metabolism of Hypokinetic Rats .	127
Biocidal Synthetic Coatings Based on High-Molecular Metalloorganic Compounds .....	130
Combined Effects of Stressors on the Level of Spinal Reflex Arc Structures .....	135
Mikhail Pavlovich Brestkin (on His Ninetieth Birthday) .....	141

**END OF**

**FICHE**

**DATE FILMED**

6 MARCH '86